



UNITED STATES PATENT AND TRADEMARK OFFICE

clm

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,325	09/16/2005	Masao Imaki	403498/SAKAI	8206

23548 7590 02/08/2007
LEYDIG VOIT & MAYER, LTD
700 THIRTEENTH ST. NW
SUITE 300
WASHINGTON, DC 20005-3960

EXAMINER

CHAPEL, DEREK S

ART UNIT	PAPER NUMBER
----------	--------------

2872

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/549,325

Applicant(s)

IMAKI ET AL.

Examiner

Derek S. Chapel

Art Unit

2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/16/2005 & 6/1/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-7 and 10-12 is/are rejected.
- 7) ☒ Claim(s) 3,4,8 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>9/16/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status Of Claims

1. This Office Action is in response to an amendment received 9/16/2005 in which Applicant lists claims 1-12 as being currently amended. It is interpreted by the examiner that claims 1-12 are pending.

The examiner notes that the applicant resubmitted the original copy of the specification, abstract and claims for the purpose of completing the record. The preliminary amended claims, received 9/16/2005, are considered the most up to date claims of record and are the claims considered by the examiner in this office action.

Information Disclosure Statement

2. The Information Disclosure Statement (IDS) filed on 9/16/2005 was considered.

Specification

3. The abstract of the disclosure is objected to because "sold" should be changed to --solid-- in the second line of the abstract. Correction is required. See MPEP § 608.01(b).

Claim Objections

4. Claims 5, 10 and 11 are objected to because of the following informalities:

Art Unit: 2872

- a. "angle between" should be changed to --an angle between-- in the fourth line of claims 5 and 10;
- b. "adjusts spot size" should be changed to --adjusts a spot size-- in the second line of claim 11.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 5 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 5 and 10 have limitations pertaining to the cases where the birefringent material is CaCO_3 or an α -BBO crystal. However, there are no limitations drawn to the case where the birefringent material is a LiIO_3 or a β -BBO crystal. Therefore, claims 5 and 10 are not further limiting to claims 4 and 9 respectively.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-2, 6-7 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sterling et al., U.S. Patent Number 6,452,725 B1, of record (hereafter Sterling) in view of Yokoyama, U.S. Patent Application Publication 2001/0022793 A1, of record (hereafter Yokoyama).

10. As to claim 1, Sterling teaches a solid material that is optically transparent (see figure 1, elements 3 or 4 and column 4, lines 44-50) and includes a pair of planar surfaces substantially parallel to each other (see figure 1, element 2 and column 4, lines 44-50); and

the solid material is a birefringent material (it is noted by the examiner that though Sterling does not specifically disclose that the solid material used in the etalon is a birefringent material, page 3 of the specification in the instant application admits that LiSAF is a birefringent crystal) having an optical axis that makes a predetermined angle with respect to a normal to the pair of planar surfaces (it is interpreted by the examiner that any optical axis, including 'a', 'b' or 'c' shown in figure 5, would satisfy this limitation in that any chosen optical axis would have some sort of predetermined angle with respect to a normal to the pair of planar surfaces even if that angle is zero), and

the wavelength filter selects light having a wavelength that is determined by optical length between the pair of planar surfaces, by resonating the light between the pair of planar surfaces (see column 2, line 54 through column 3, line 20).

Sterling does not specifically disclose a supporting member that supports the solid material on a planar surface of the solid material, other than the pair of planar surfaces, the supporting member having rigidity higher than that of the solid material.

However, Yokoyama discloses an etalon type wavelength filter (see figure 1, element 31 of Yokoyama) and a supporting member that supports the solid material on a planar surface of the solid material, other than the pair of planar surfaces (see figure 1, element 7 of Yokoyama).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Yokoyama with the wavelength filter of Sterling to produce a wavelength filter having a supporting member that supports the solid material on a planar surface of the solid material, other than the pair of planar surfaces, the supporting member having rigidity higher than that of the solid material, for the purpose of rigidly supporting all of the fragile optical components and maintaining the optical components spatial relationships to one another.

11. As to claim 2, Sterling in view of Yokoyama discloses the combination of claim 1, wherein the predetermined angle is set so that a temperature coefficient of the optical length has a predetermined value when the birefringent material is fixed on the supporting member (it is further noted by the examiner that any selected predetermined angle would also produce a temperature coefficient of the optical length having "a

Art Unit: 2872

predetermined value" when the birefringent material is affixed onto the supporting member).

12. As to claim 6, Sterling teaches a wavelength filter (see figure 1) that includes a solid material that is optically transparent (see figure 1, elements 3 or 4 and column 4, lines 44-50) and includes a pair of planar surfaces substantially in parallel to each other (see figure 1, element 2 and column 4, lines 44-50);

wherein the solid material is a birefringent material (it is noted by the examiner that though Sterling does not specifically disclose that the solid material used in the etalon is a birefringent material, page 3 of the specification in the instant application admits that LiSAF is a birefringent crystal) having an optical axis that makes a predetermined angle with respect to a normal to the pair of planar surfaces (it is interpreted by the examiner that any optical axis, including 'a', 'b' or 'c' shown in figure 5, would satisfy this limitation in that any chosen optical axis would have some sort of predetermined angle with respect to a normal to the pair of planar surfaces even if that angle is zero).

Sterling does not disclose a wavelength detecting unit that detects emission wavelength of the laser light based on transmission light transmitted by the wavelength filter; and

a supporting member that supports the wavelength detecting unit and the wavelength filter on a planar surface of the wavelength filter, other than the pair of planar surfaces, the supporting member having a rigidity higher than that of the solid material.

However, Yokoyama discloses a wavelength detecting unit (see figure 1 of Yokoyama) that detects emission wavelength of the laser light based on transmission light transmitted by the wavelength filter (see figure 1 and paragraph [0028] of Yokoyama); and

a supporting member that supports the wavelength detecting unit and the wavelength filter on a planar surface of the wavelength filter, other than the pair of planar surfaces (see figure 1, element 7 of Yokoyama).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Yokoyama with the wavelength filter of Sterling to produce a wavelength detecting unit that detects emission wavelength of the laser light based on transmission light transmitted by the wavelength filter; and a supporting member that supports the wavelength detecting unit and the wavelength filter on a planar surface of the wavelength filter, other than the pair of planar surfaces, the supporting member having a rigidity higher than that of the solid material, for the purpose of monitoring a semiconductor laser output wavelength and maintaining a steady semiconductor laser output wavelength, rigidly supporting all of the fragile optical components and maintaining the optical components spatial relationships to one another.

13. As to claim 7, Sterling in view of Yokoyama discloses the combination of claim 6. Sterling further teaches placing an optional polarizer between a light source and the etalon wavelength filter to create the desired input into the wavelength filter by polarizing the laser light output from the laser light source in one direction (see figure 2,

elements 7 and 10 and column 4, lines 57-67 of Sterling). As to the limitation that the predetermined angle is set so that temperature coefficient of the optical length has a predetermined value when the birefringent material is fixed on the supporting member, it is noted by the examiner that any selected predetermined angle would also produce a temperature coefficient of the optical length having "a predetermined value" when the birefringent material is affixed onto the supporting member.

14. As to claim 11, Sterling in view of Yokoyama disclose the combination of claim 6, further comprising a lens that adjusts a spot size of the laser light output from the semiconductor laser (see figure 1, elements 1 and 2 of Yokoyama), and that outputs the laser light with the spot size adjusted to the wavelength filter (see figure 1 of Yokoyama).

15. As to claim 12, Sterling in view of Yokoyama disclose the combination of claim 6, wherein the wavelength detecting unit includes a first photodetector that detects transmission light transmitted by the wavelength filter (see figure 1, element 6 of Yokoyama) and that outputs a first detecting signal (see paragraphs [0028] and [0093]-[0095] of Yokoyama);

a second photodetector that directly detects the laser light output from the semiconductor laser (see figure 1, element 5 of Yokoyama) and that outputs a second detecting signal (see paragraphs [0028] and [0093]-[0095] of Yokoyama); and

a wavelength detector that detects the emission wavelength of the laser light based on a ratio of the first detecting signal and the second detecting signal (see figure 1, element 8 and paragraphs [0028] and [0093]-[0095] of Yokoyama).

Allowable Subject Matter

16. Claims 3-4 and 8-9 would be allowable if rewritten to overcome the claim objections cited in this office action above and rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. Claims 5 and 10 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter: Claims 3 and 8 would allowable over the cited art of record, if rewritten in independent form including all of the limitations of the base claim and any intervening claims, for at least the reason that the cited art of record fails to teach or reasonably suggest a wavelength filter or a wavelength monitor having a wavelength filter wherein the predetermined angle is set so that absolute value of a sum of (i) a product of (a) difference between linear expansion coefficients of the birefringent material and the supporting member and (b) refractive index of the birefringent material, (ii) thermo-optical coefficient of the birefringent material, and (iii) change of refractive index due to a thermal strain between the supporting member and the birefringent material is minimized, as generally set forth in claims 3 and 8, the device including, in combination with the features recited in claims 1-2 and 6-7 respectively. Claims 4-5 and 9-10 depend from claims 3 and 8 respectively and therefore would be allowable for at least the same reasons as claims 3 and 8.

Other Related Art

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

20. Flint et al., U.S. Patent Number 6,816,534 B2 teaches a crystalline etalon wavelength filter (see figures 6 and 7).

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek S. Chapel whose telephone number is 571-272-8042. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/549,325

Page 11

Art Unit: 2872

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek Chupel
DSC
2/2/2007

Arnel C. Lavarias
ARNEL LAVARIAS
PRIMARY PATENT EXAMINER